

3/21/2006 Response to Office Action
U.S.S.N. 10/616,335

Page 2

REMARKS

Claims 1-19 are pending in this application. Claims 1-19 are directed towards a method of polishing a substrate including at least one metal layer comprising preparing a polishing composition having an abrasive, at least one oxidizer and a complexing agent, wherein the slurry does not contain an abrasive.

The Office Action has rejected claims 1-19 on the grounds of non-statutory obviousness-type double patenting as being unpatentable over claims 1-38 of U.S. Patent No. 5,783,489. The Office Action states that although the conflicting claims are not identical, they are not patentably distinct. The Office Action states that the '489 patent fails to teach the specific usage of a complexing agent, specific process parameters, use of colloidal silica, use of tartaric and the use of a surfactant. The Office Action asserts that it would have been inherent that the succinic acid of the '489 patent would function as a complexing agent.

Applicants respectfully disagree. The '489 patent teaches a chemical mechanical polishing composition comprising an abrasive, a first oxidizer, a second oxidizer, and at least one organic acid. The '489 patent, however, teaches that the preferred organic acid is succinic because it has been found to promote passivation of aluminum to inhibit the removal of the dielectric layer (see for example column 4, lines 24-28). Therefore, the criteria for selection of an organic acid for the practice of the '489 patent is very different from that of the complexing agent taught by the present application. In the present application, the complexing agents are stated as being useful in combination with oxidizing agents to control surface dissolution in order to minimize surface defectivity (see for example paragraph [0030]). Quoting from *In re Sporeman*, 363F.2d 444, 448, 150 U.S.P.Q 449, 452 (C.C.P.A. 1966), "(t)he inherency of an advantage and its obviousness are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicted on what is unknown." Therefore, a person skilled in the art would be selecting the specific organic acid, the specific oxidizers, and concentrations and ratios thereof, based upon expected results for passivation of aluminum and inhibition of the dielectric layer removal rates. Without prior knowledge of the present invention, a person skilled in the art would not be motivated to modify the '366 patent to arrive at the method of the claimed invention.

The Office Action additionally states that it would have been obvious to one skilled in the art to employ colloidal silica as the metal oxide abrasive and to use a surfactant. Furthermore the Office Action argues that it would have been *prima facie* obvious to employ any of a variety of different process parameters in the cmp polishing process taught by the

Cabot Microelectronics Corporation
870 North Commons Drive
Aurora, IL, 60504
Tel. (630) 375-5465

3/21/2006 Response to Office Action
U.S.S.N. 10/616,335

Page 3

present invention. The applicants respectfully disagree. Quoting *In re Rouffet*, 149 F. 3d 1350, 47 U.S.P.Q. 2d 1458 (Fed. Cir. 1998), "the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." The choice of abrasive, surfactant and process parameters may have been obvious to try, but without the teaching of the present invention, there would be no expectation of success. Applicants respectfully request that the rejection on the grounds of non-statutory obviousness-type double patenting over claims 1-38 of U.S. Patent No. 5,783,489 be withdrawn.

Claims 1-15 are rejected on the grounds of non-statutory obviousness-type double patenting as allegedly being unpatentable over claims 1-31 of U.S. Patent No. 5,858,813. The Office Action states that although the claims are not identical, they are not patentably distinct from each other because the '813 patent claims a method for cmp polishing a metal layer using a composition including a surfactant, an organic acid, an oxidizer and a metal oxide abrasive particle. The Office Action further states that the '813 patent fails to teach the specific usage of a complexing agent, specific process parameters, usage of colloidal silica.

The applicants respectfully disagree. However, to facilitate prosecution of this application, and to overcome the non-statutory obviousness-type double patenting rejection, applicants concurrently herewith file a terminal disclaimer related to U.S. Patent No. 5,858,813. The terminal disclaimer is attached to this paper.

Claims 1-15 are rejected on the grounds of non-statutory obviousness-type double patenting as allegedly being unpatentable over claims 1-31 of U.S. Patent No. 5,980,775. The Office Action states that although the claims are not identical, they are not patentably distinct from each other because the '775 patent claims a method for cmp polishing a metal layer using a cmp slurry which is comprised of an organic acid stabilizer, an oxidizer and a metal oxide abrasive particle. The Office Action further states that the '775 patent fails to teach the use of a surfactant, use of a complexing agent and use of colloidal silica. The Office Action asserts that it would have been inherent that the citric acid in the slurry taught by the '775 patent would function as a complexing agent.

The applicants respectfully disagree. The '775 discloses and claims a stabilizer that can be an inorganic or organic acid, a nitrile or mixtures thereof. The stated purpose of the stabilizer is to stabilize the oxidizer in the presence of the metal complex. The method claimed by the '787 patent is one where the metal catalyst and the complexing agent are admixed to form a second component. This second component is then admixed with the first

Cabot Microelectronics Corporation
870 North Commons Drive
Aurora, IL, 60504
Tel. (630) 375-5465

3/21/2006 Response to Office Action
U.S.S.N. 10/616,335

Page 4

component, an oxidizer, to give a chemical mechanical polishing composition. The present invention claims a method wherein the polishing composition is prepared having an abrasive, at least one oxidizer, and a complexing agent. The '775 patent, therefore, teaches away from the present invention by requiring the formation of a second component with a metal catalyst. A person of skill in the art would be required to proceed contrary to the teachings of the cited art to arrive at the present invention. For at least these reasons, the present invention is patentably distinct from the '775 patent claims. Applicants respectfully request that the rejection on the grounds of non-statutory obviousness-type double patenting over claims 1-31 of U.S. Patent No. 5,980,775 be withdrawn.

Claims 1-15 are rejected on the grounds of non-statutory obviousness-type double patenting as allegedly being unpatentable over claims 11-18 of U.S. Patent No. 6,068,787. The Office Action states that although the claims are not identical, they are not patentably distinct from each other because the '787 patent claims a method for cmp polishing a metal layer using a cmp slurry which comprised an organic acid stabilizer and oxidizer, and a metal oxide abrasive particle. The Office Action further states that the '787 patent fails to claim the specific usage of a surfactant the usage of a complexing agent, and usage of colloidal silica. The Office action asserts that it would have been inherent that the malonic acid in the cmp slurry taught by the '787 patent would function as a type of complexing agent since the same chemistry is involved.

The applicants respectfully disagree. The '787 discloses and claims a stabilizer that can be an inorganic or organic acid, a nitrile or mixtures thereof. The stated purpose of the stabilizer is to stabilize the oxidizer in the presence of the metal complex. The method claimed by the '787 patent is one where the metal catalyst and the complexing agent are admixed to form a precursor. This precursor is then admixed with the oxidizer to give a chemical mechanical polishing composition. The present invention claims a method wherein the polishing composition is prepared having an abrasive, at least one oxidizer, and a complexing agent. The '787 patent, therefore, teaches away from the present invention by requiring the formation of a precursor with a metal catalyst. A person of skill in the art would be required to proceed contrary to the teachings of the cited art to arrive at the present invention. For at least these reasons, the present invention is patentably distinct from the '787 patent claims. The applicants respectfully request that the rejection on the grounds of non-statutory obviousness-type double patenting over claims 11-18 of U.S. Patent No. 6,068,787 be withdrawn.

Cabot Microelectronics Corporation
870 North Commons Drive
Aurora, IL, 60504
Tel. (630) 375-5465

3/21/2006 Response to Office Action
U.S.S.N. 10/616,335

Page 5

Claims 1-15 are rejected on the grounds of non-statutory obviousness-type double patenting as allegedly being unpatentable over claims 1-7 of U.S. Patent No. 6,316,366. The Office Action states that although the claims are not identical, they are not patentably distinct from each other because the '366 patent claims a method for cmp polishing a metal layer using a cmp slurry which comprised succinic acid and an oxidizer, and a metal oxide abrasive particle. The Office Action further states that the '366 patent fails to claim the specific usage of a surfactant, the usage of a complexing agent, and usage of colloidal silica. The Office action asserts that it would have been inherent that the succinic acid in the cmp slurry taught by the '366 patent would function as a type of complexing agent since the same chemistry is involved.

The applicants respectfully disagree. The '366 patent teaches the use of succinic acid in an amount sufficient to enhance the oxide selectivity without detrimentally effecting the stability of the CMP slurry. The '366 patent states that succinic acid has been found to promote passivation of aluminum and it also inhibits the removal if the dielectric layer. See, for example, column 7, lines 5-8. Therefore, a person skilled in the art would be selecting the specific organic acid, oxidizers, and concentrations thereof, based upon expected results for passivation of aluminum and inhibition of the dielectric layer removal rates. For the reasons stated above, a person skilled in the art would not be motivated to modify the '366 patent to arrive at the method of the present invention. The applicants respectfully request that the rejection on the grounds of non-statutory obviousness-type double patenting over claims 1-7 of U.S. Patent No. 6,316,366 be withdrawn.

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned agent.

Respectfully submitted,

By 
Thomas Omholt (Reg. No. 37,052)
Agent for Applicant(s)

Cabot Microelectronics Corporation
870 North Commons Drive
Aurora, IL, 60504
Tel. (630) 375-5465